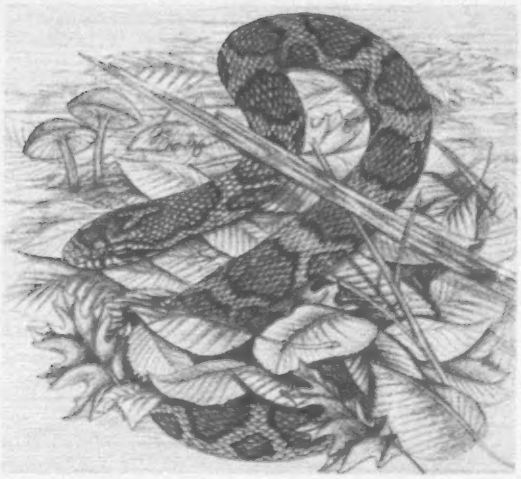
COSEWIC
Assessment and Status Report

on the

Milksnake
Lampropeltis tirangulum

in Canada



SPECIAL CONCERN
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE IN
CANADA

COSEPAC
COMITÉ SUR LA SITUATION DES
ESPÈCES EN PÉRIL
AU CANADA

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Production note:

1. The Eastern Milksnake *Lampropeltis triangulum triangulum* that is discussed in this report is the only subspecies of the Milksnake *Lampropeltis triangulum* that occurs in Canada. For purposes of COSEWIC, which designates only species that occur in Canada, these two names should be regarded as synonymous.
2. Previously listed by COSEWIC as Eastern Milksnake *Lampropeltis triangulum.*

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COSEWIC
Assessment Summary

Assessment Summary – May 2002

Common name
Milksnake

Scientific name
Lampropeltis triangulum

Status
Special Concern

Reason for designation
This species is still widespread in Ontario but anecdotal information indicates that it occurs in small numbers. The species maintains a small but apparently stable population in Quebec. The Milksnake is subject to high levels of road kill and is still deliberately killed because of its resemblance to venomous species. Currently, there is only anecdotal information of this species' biology in Canada, with no quantitative data on life history and demographic measures and no quantitative data on abundance or trends in abundance.

Occurrence
Ontario and Quebec

Status history
Designated Special Concern in May 2002. Assessment based on an new status report.

COSEWIC
Executive Summary

Milksnake
Lampropeltis triangulum

Species Information

The Milksnake, *Lampropeltis triangulum*, is one of six species of kingsnake found in North America. The Eastern Milksnake, *Lampropeltis triangulum triangulum*, is one of 25 subspecies of Milksnake recognized throughout North, Central and South America. Nine of these subspecies are found across North America. Extreme variation in colour and pattern occur within the species complex, and the taxonomy, variation and geographic distribution of kingsnakes remain uncertain. The Eastern Milksnake has large red and brown dorsal blotches on a whitish background, which fade as the snake ages. The maximum total length recorded for this subspecies is 132 cm, although normal lengths range from 60-90 cm.

Distribution

The Eastern Milksnake is found throughout the Great Lakes region including southern Ontario and Quebec. In Ontario, the snake ranges as far north as Lake Nipissing and Sault Ste. Marie. In Quebec, it occurs along the Ontario/Quebec border and south of the St. Lawrence River, west of the St. François River. The United States distribution of the Eastern Milksnake includes the Great Lakes states (Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania and New York) as well as the New England states and south to Virginia, Kentucky and North Carolina.

Habitat

The Eastern Milksnake occupies a wide variety of habitats including field, swamp and open woodlot. It requires suitable cover for egg laying, hibernation and thermoregulation. In Ontario, this snake is more common in heavily forested areas (deciduous, evergreen and mixed) than in areas of low forest cover. However, Eastern Milksnakes are also common in rural pastures and hayfields, as well as in and around barns, sheds and houses.

Biology

The Milksnake's mating period takes place over several weeks in April and May following emergence from underground hibernacula. An average of 8-11 eggs are laid

in rotting logs, sand, compost, under boards and other suitable cover or substrate. Hatchlings generally emerge from August to September, although some have been observed in July in the Hamilton area. The predominant prey items of the Eastern Milksnake are small mammals. When threatened, the Milksnake will vibrate its tail rapidly and when the tail strikes dry leaves this vibration makes a sound remarkably similar to a rattlesnake.

Population sizes and trends

Quantitative estimates for provincial populations of *L.t. triangulum* are not available for either Ontario or Quebec and there have been no population or ecological studies of this species in Canada. Undoubtedly, some populations have been extirpated from large urban centres or regions with intensive agriculture where habitat has been lost. However, this species is known to survive in suburban and agricultural areas. Observations in Ontario have been numerous; maps of past and present sightings (as of 1994) suggest that Eastern Milksnake populations have maintained much of their historical range and have not been eliminated from any large areas. In Quebec, the distribution of the Eastern Milksnake is very limited with the most numerous sightings recorded from the southern Gatineau and Montreal regions. No quantitative assessments have been made of population trends in the Eastern Milksnake in either Quebec or Ontario.

Limiting factors and threats

The majority of the Eastern Milksnake's distribution coincides with agricultural and highly populated areas, thus the snake is susceptible to the effects of human encroachment as well as habitat loss. Many Milksnakes have been killed by vehicular traffic ("road-kill") or by agricultural machinery. The Milksnake has been, and continues to be, persecuted for a number of reasons. First, because Milksnakes are found within and around houses, sheds and barns, many are killed by people who dislike snakes. Second, the popular myth that Milksnakes decrease milk production by draining milk from dairy cattle has caused farmers to persecute them. Finally, when this snake becomes alarmed it has a tendency to vibrate its tail like a rattlesnake (a venomous snake), and to strike at tormentors, with the result that confused humans often kill the snake out of fear, not realizing that it is harmless.

Special significance of the species

The Eastern Milksnake is the only subspecies of Milksnake found in Canada. It is also the only constrictor found in Quebec. The snake's presence in barns and stables has proven to be beneficial, as the snake helps to control rodent populations (its prey).

Existing protection or other status designations

In both Ontario and Quebec, the Milksnake is protected in all Provincial and National parks. In Ontario, the snake is afforded protection under the 1997 Ontario Fish and Wildlife Act. This act makes killing or possession of this species illegal without a permit.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.
** Formerly described as "Not In Any Category", or "No Designation Required."
*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report

on the

Milksnake

Lampropeltis triangulum

in Canada

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2002

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SPECIES INFORMATION

Name and classification

The Milksnake is also known by many other names including kingsnake, house snake, checkered adder, cow sucker, chicken snake, red milksnake, red house snake, house moccasin (McCauley 1945), hardwood rattler (Johnson 1989), and spotted adder (Harding 1997). Approximately, 25 subspecies of the Milksnake (*Lampropeltis triangulum*) are recognized throughout North, Central and South America (Lamond 1994; Williams 1994). Nine of these subspecies are found within North America, whereas the others range from Mexico to Ecuador (Conant and Collins 1991; Crother 2000). As such, this species has one of the largest distributions of any snake (Lamond 1994). Extreme colour and pattern variations occur between the different subspecies (Lamond 1994; Tyning 1990). Such variations can be attributed to the different prey species, natural predators, habitat and climate it is exposed to over its range (Fitch and Fleet 1970). The Eastern Milksnake (*Lampropeltis triangulum triangulum*) is the most northerly of the subspecies (Bartlett 1987), and it is the only subspecies that is found in Canada (Lamond 1994; Bider and Matte 1996).

Description

The genus name *Lampropeltis* means "shiny shield" (Tyning 1990) referring to the glossy, smooth, unkeeled dorsal scales of the Milksnake (Logier 1958). *Triangulum* is derived from triangulus, which is Latin for "having three angles" or "triangle". This refers to the shape of the first blotch that extends from the neck onto the head of the Eastern Milksnake (Williams 1994; Mitchell 1994). This light coloured "Y' or "V' patch is characteristically used to identify this subspecies (Williams 1994; Bider and Matte 1996). However, similar to the pattern of other Milksnake subspecies, this "V' or "Y" is sometimes only a light ring around the neck of the snake (Conant and Collins 1991). Unlike the other subspecies, the Eastern Milksnake has three (sometimes five) rows of chocolate-brown or reddish-brown blotches down its body (Conant and Collins 1991). These blotches are bright red on young Milksnakes (Bider and Matte 1996) and become duller and more brownish in colour as the snake grows (P. Gregory, pers. comm.). The dorsal blotches are large and usually extend to the third or fourth scale row on either side of the body ranging from 24 to 54 in number. These blotches alternate with irregularly shaped smaller lateral blotches (Williams 1994). All blotches are outlined in black on a creamy brown or gray background (Bider and Matte 1996) and do not extend to the belly of the snake (Cochran and Goin 1970). The ventral surface has a black rectangular checkerboard pattern, which is often irregular, on a gray, tan or even whitish background (Conant and Collins 1991; P. Gregory, pers. comm.). The Eastern Milksnake has a single, undivided anal plate (Cook 1984). Scale rows at midbody range in number from 19 to 23 rows (Harding 1997).

The maximum total length recorded for the Eastern Milksnake is 132 cm (Cook 1984) although there is a report of one Ontario specimen over 140 cm (R. Brooks, pers. comm.); however, the normal range is between 60 and 90 cm (Strickland and Rutter

1992). The subspecies found in North America do not get as long as their neotropical counterparts (Behler 1979). The head of the Eastern Milksnake is small and somewhat indistinct from the neck, and the body is slender and nearly the same diameter for its entire length (Froom 1972). Males tend to be longer than females (Tyning 1990) although in general, as is the case with most snakes (P. Gregory, pers. comm.), there are no dependable external features that distinguish the sexes (Harding 1997). Males generally have shorter tails than the females (Dyrkacz 1977). In males, the tail length is about 13.5% of total length, whereas in females the tail is approximately 14.4% of total length (Williams 1994). Males also tend to have a slight constriction close to the cloaca (Tyning 1990). Gravid females tend to have a thicker body posteriorly, tapering at the anal plate (Harding 1997).

DISTRIBUTION

United States range

In the United States, the Eastern Milksnake is found in 26 states. It occurs throughout the Great Lakes States (New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota) as well as from Maine southward into the Appalachian Mountains through to North Carolina, Tennessee, Virginia, Kentucky and the extreme northern parts of Alabama and Georgia. The Eastern Milksnake's range also extends as far west as Iowa (Conant and Collins 1991). In Great Smoky National Park, this snake has been recorded at altitudes from 470 m to 1400 m (Huheey and Stupka 1967).

The Eastern Milksnake intergrades with the Scarlet Kingsnake (*Lampropeltis triangulum elapsoides*) in southern New Jersey, Maryland, northern Virginia (Williams 1988) and northeastern North Carolina (Conant and Collins 1991). It also intergrades with the Red Milksnake (*L. t. syspila*) in northwestern Tennessee, western Kentucky, and southern Indiana to central Iowa (Williams 1988).

Canadian range

In Ontario, the Eastern Milksnake is ranked S4 (common) (Natureserve, 2002). It is found as far north as Lake Nipissing and Sault Ste. Marie (Lamond 1994) as well as throughout southern Ontario where suitable habitat remains (Froom 1972). The Eastern Milksnake is found within most of the Great Lakes region; however, it seems to be absent from both the northern and western watersheds of Lake Superior (Harding 1997) (Figure 2).

In Quebec (Figure 3), the distribution of the Eastern Milksnake is quite limited (Bider and Matte 1996), and therefore it is ranked as S3 (rare to uncommon) (Marium Steiner, pers. comm.). It is found in the southwestern part of Quebec from the Ontario/Quebec border to Yamaska southwest of Lac St. Pierre. As the Yamaska record dates back to 1874, it is unknown whether the Eastern Milksnake is more widespread within this area or extirpated (or nearly so) due to the effects of urbanization

Figure 1. Distribution of the Eastern Milksnake in North America (Conant and Collins, 1991).

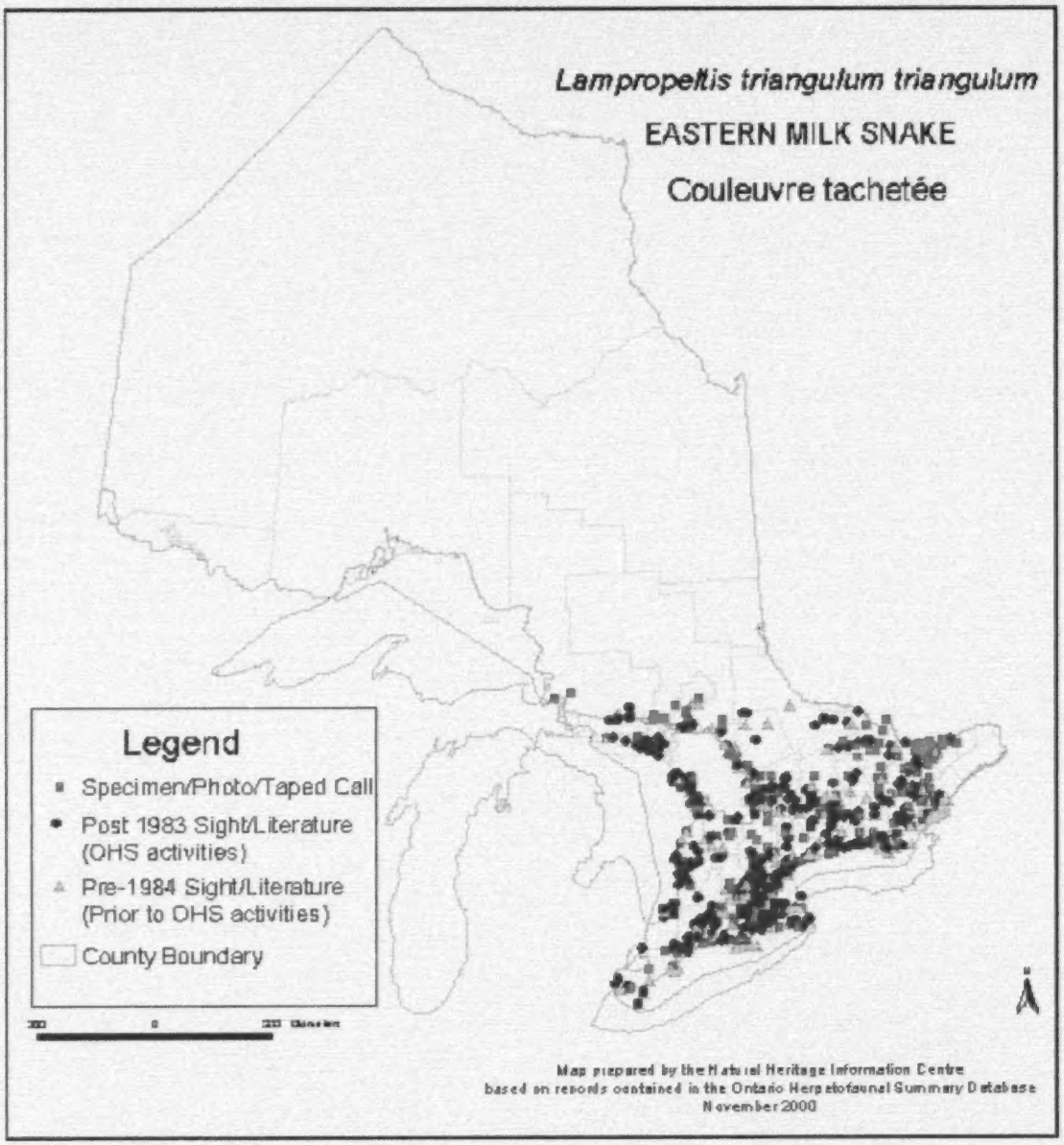
Lampropeltis triangulum triangulum
EASTERN MILK SNAKE
Couleuvre tachetée
Legend
Specimen/Photo/Taped Call
Post 1983 Sight/Literature (OHS activities)
Pre-1984 Sight/Literature (Prior to OHS activities)
County Boundary
Map prepared by the Natural Heritage Information Centre
based on records contained in the Ontario Herpetofaunal Summary Database
November 2000

Figure 2. Distribution of the Eastern Milksnake in Ontario (Ontario Herpetofaunal Summary/OHS Database, 2000).

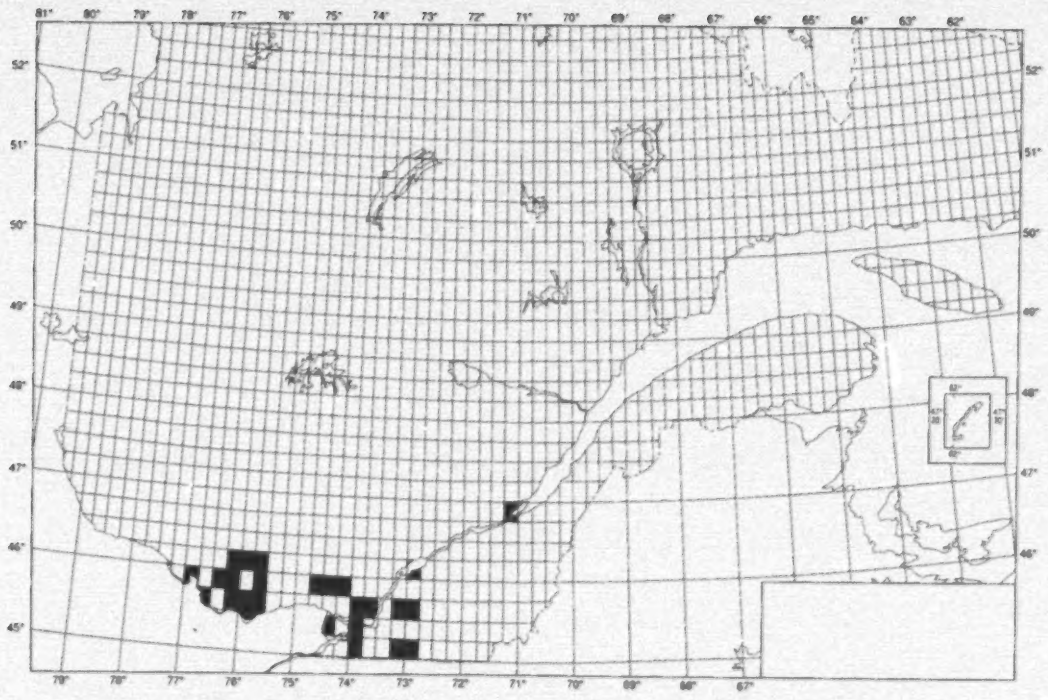

Figure 3. Distribution of the Eastern Milksnake in Quebec (Bider and Matte, 1996).

(Froom 1972). The same rationale as above could be used for the Quebec City area, as there has been only one record since 1958 (Bider and Matte 1996. The Eastern Milksnake is regularly found along the St. Lawrence lowlands (Bleakney 1958) and occurs within the fluvial section (from Cornwall, Ontario to just west of the Quebec border, to Lac St. Pierre) of the St. Lawrence river (St. Lawrence Centre 1996). South of the St. Lawrence River, it is found only west of the St-François River (Bider and Matte 1996). There are a number of records from the southern Gatineau and Montreal regions (Bider and Matte 1996). Only a few sightings of the Eastern Milksnake are reported each year in Quebec (D. Rodrigue, pers. comm.). Recent sightings of the milksnake within Quebec have only confirmed their known range rather than increasing it (Bider and Matte 1996).

HABITAT

Habitat requirements

The Eastern Milksnake is found in an extremely wide variety of habitats. It does not appear to prefer any particular habitat (Shaffer 1991). It is quite often found in prairies, meadows (Tyning 1990), pastures, hayfields (Lamond 1994), rock outcrops

(Mitchell 1994), and rocky hillsides (Conant and Collins 1991). The Eastern Milksnake can also be found in a variety of forest types such as deciduous forests, pine plantations, bog forests (Tyning 1990), pine forests, and mixed pine-hardwoods (Mitchell 1994). In Ontario, this snake is also found in the edge habitat of these woods in areas such as power-line cuts and railway embankments (Lamond 1994). Furthermore, in Ontario, the Eastern Milksnake appears to be more common in areas that are heavily forested such as western Milton, adjacent to Flamborough, and Halton Hills, as opposed to areas with a lower percentage of forest cover such as Brantford, Glanbrook, adjacent to Halton Hills, and eastern Milton. The Hamilton Herpetofaunal Atlas discerned this by comparing Milksnake distribution in southern Ontario to forest cover maps of that same area (Lamond 1994).

The Eastern Milksnake is, however, best known for occurring in rural areas where it is most often reported in and around buildings such as barns, sheds and houses (Lamond 1994) and especially old structures (Williams 1988). It will enter the foundations of these structures in search of food or shelter, and thus it is quite often reported in basements (Lamond 1994). This snake has also been seen in suburban parks and gardens (Harding 1997). It can live in habitats that occur at sea level to elevations as high as 1430 m (Williams 1988). The Eastern Milksnake is usually found in areas that are close to a water source (Oldfield and Moriarty 1994). It is presumed that juveniles utilize the same habitat as adult milksnakes because sightings of both juveniles and adults occur in the same areas (A. Lentini, pers. comm).

With respect to special habitat requirements, the Eastern Milksnake needs suitable cover for egg-laying (DeGraaf and Rudis 1983) and hibernation (A. Lentini, pers. comm.). Requirements for egg-laying sites and suitable hibernating areas will be discussed further in the sections on reproduction and hibernation, respectively.

Although Milksnakes can be found basking in the open they do not appear to bask as openly as other snake species (Tyning 1990). They often thermoregulate by obtaining heat from the underside of an object that is in direct sunlight (Ernst and Barbour 1989). For this reason, Milksnakes are usually found under suitable objects or covers including large planks around farm buildings, debris, stumps along woodlot edges (Lamond 1994), decaying logs, rocks and rock piles, stones, bark, rubbish, tar paper, iron sheets (Williams 1994), and damp trash (Shaffer 1991). It is apparent that the Eastern Milksnake can live in almost any habitat that provides shelter and a source of food (Harding 1997).

Trends

There is not enough information available to determine the number of historical sites that are currently used by the Eastern Milksnake in Ontario (M. Oldham, pers. comm.) or Quebec (D. Rodrique, pers. comm.). Without a doubt, habitat has been destroyed where the species has occurred historically, due to urbanization or intense agriculture. However, as this species is able to persevere in suburban and agricultural situations, it may not have been extirpated from many such areas (M. Oldham, pers. comm.). However, there is little information to support or reject this hypothesis.

Protection/ownership

In Canada, the Eastern Milksnake is protected in all provincial and national parks as well as in most conservation areas (M. Oldham, pers. comm.). Approximately 40 of the sites where the Eastern Milksnake has been found are within protected natural areas (Table 1).

Table 1. State/Park ranks for the Eastern Milksnake (*L.t. triangulum*).

State/Park	Rank
Alabama	S5
Connecticut	S5
Delaware	S2
Georgia	S2
Great Smoky National Park	P3
Illinois	S?
Indiana	S?
Iowa	S4
Kentucky	SU
Maine	S5
Maryland	S5
Massachusetts	S5
Michigan	S5
Minnesota	S4
New Hampshire	S5
New Jersey	S?
New York	S4
Ohio	S?
Pennsylvania	S5
Rhode Island	S5
South Carolina	S2
Tennessee	S?
Vermont	S5
Virginia	S5
West Virginia	S5
Wisconsin	S4

(Provided by Marium Steiner of the Eastern Regional Office of the Nature Conservancy, Boston, MA)

NOTE:
S1 = critically imperiled in State or subnation
S2 = imperiled in State or subnation
S3 = rare or uncommon
S4 = widespread, abundant, common and apparently secure, but with cause for long term concern
S5 = demonstrably widespread, abundant and secure
SU = unrankable
S? = unranked
P3 = rare or uncommon within a park
(Provided by Lara Minium of the Eastern Regional Office of the Nature Conservancy)

BIOLOGY

Reproduction

Surprisingly, given its wide distribution and size, very little is known about the reproduction of the Eastern Milksnake (Mitchell 1994). Presumably, the breeding habits of this species reflect those of typical oviparous (egg-laying) snakes (Ditmars 1907). Two to three weeks after emerging from hibernation, mates are sought out (Tyning 1990). Mating occurs over a period of several weeks, usually extending from mid-April to early June (Lamond 1994). The majority of copulations occur in May (Ernst and Barbour 1989). In early summer, female Milksnakes seem to gather at communal egg-laying sites, with clutches often laid within several centimeters of each other. The behavioural significance of this is unclear; however, it may be attributed to a lack of suitable egg-laying sites (Tyning 1990; P. Gregory, pers. comm.).

Gestation in the Eastern Milksnake is usually 30 to 40 days. Nesting season occurs from late May to early July (Ernst and Barbour 1989). Gravid females most likely stop eating a few weeks before oviposition. Thus, the time and energy that is normally used in foraging can instead be used to enhance egg development by basking as well as to find a place to lay eggs (Henderson et al. 1980). An aggregation of 10 gravid female Eastern Milksnakes was found under a discarded sheet of metal located adjacent to a paved road at a site in southwestern Wisconsin. This metal sheet presumably provided conditions for thermoregulation and protection that were not available elsewhere. Therefore, such aggregations most likely do not occur for social reasons (Henderson et al. 1980). Although the female does not build a nest, there are indications that she creates a small chamber within which the eggs are deposited (Tyning 1990).

Eggs are laid in a variety of substrates including rotting logs (Strickland and Rutter 1992; Lamond 1994), stumps, mammal burrows (Ernst and Barbour 1989), piles of manure, leaf mounds (Froom 1972), sawdust piles (Lamond 1994), compost (Tyning 1990), sand, under boards, logs, or in loose soil (Williams 1988). The deposition of most eggs occurs from late May to July (Ernst and Barbour 1989). Eggs are elliptical (Shaffer 1991), smooth, tough, opaque, and leathery-white and may, but not always, adhere to one another in a cluster (Williams 1988). The eggs are 21-35 mm in length, 11-15 mm wide and each egg weighs approximately 4.5 g (Ernst and Barbour 1989). Clutch size can vary from 3-20 eggs; however, normally an average of 8-11 are laid (Lamond 1994). The number of eggs laid is correlated with the body length of the female (Ernst and Barbour 1989). For example, subspecies such as *L. t. syspila* which have been recorded to reach total lengths up to 92 cm (Fitch and Fleet 1970) lay only 4-9 eggs (Ernst and Barbour 1989), whereas female L. t. triangulum, which attain greater lengths, lay 8-11 eggs (Fitch and Fleet 1970).

It is thought that only a single clutch is laid each year, however it is unknown whether the female requires two years to produce a new clutch or if she reproduces annually (Tyning 1990). According to Tryon (1984) some females have the potential to

lay 2 clutches each year (as cited in Ernst and Barbour 1989). This seems unlikely in Canada due to the short active season and lengthy gestation period of the Milksnake (P. Gregory, pers. comm.). Incubation of the eggs takes 50 to 70 days (Ernst and Barbour 1989) at a constant temperature of approximately 24°C (Williams 1988). Hatching normally occurs in August or September (Ernst and Barbour 1989); however, some hatchlings in southern Ontario have been seen in July (Lamond 1994). An eggtooth on the tip of the hatchling's snout allows it to cut its way out of the egg (Tyning 1990). In total length, hatchlings range from 162-241 mm (Williams 1988). The hatchlings possess the same patterning as the adults, but with brighter red dorsal blotches (Oldfield and Moriarty 1994).

Sexual maturity is reached at approximately 3 to 4 years of age (DeGraaf and Rudis 1983; Fitch and Fleet 1970). The longest living Eastern Milksnake recorded was a female that was caught as an adult and lived an additional 21 years, 4 months and 14 days at the Philadelphia zoo (Ernst and Barbour 1989).

Physiology

Body temperatures of the Eastern Milksnake were recorded by Henderson et al. (1980) in a range between 13° C and 30° C. The critical temperatures for the Eastern Milksnake to survive are unknown, although they are probably similar to critical temperatures of other temperate zone colubrids (P. Gregory, pers. comm.). In relatively high temperatures, it is reasonable to assume that the Milksnake can seek shelter under logs or other suitable shelters to prevent over-heating.

The Eastern Milksnake usually thermoregulates by obtaining heat from the underside of an object in direct sunlight (Ernst and Barbour 1989). On warm, sunny days, the snake will absorb heat from objects such as leaves (Tyning 1990), boards (Willliams 1994), metal sheets (Henderson et al. 1980) and other suitable cover. However, as the air temperature drops, the snakes tend to move below the frost line (Johnson 1989). At night, the Milksnake may also take advantage of warm black-topped roadways, which is obviously a bad strategy (Harding 1997).

As snakes need to raise their body temperatures to help in the digestion of food or to advance the development of their eggs, basking under objects allows them to do so at a decreased risk of predation (Henderson et al. 1980). This is especially important for gravid females that have to maintain a higher, more stable body temperature than non-gravid females in order to attain proper egg development. Basking in the open makes gravid females more vulnerable to predators because they are slower moving than non-gravid individuals (Bider and Matte 1996). This behaviour is fairly common in other snakes (P. Gregory, pers. comm.).

Feeding habits

More is known about the food habits of the Eastern Milksnake than of any other subspecies (Williams 1988). The Eastern Milksnake is restricted to relatively small prey

(Tyning 1990) because its small, delicate jaw and slim body are not suited to handling large, bulky prey (Fitch and Fleet 1970). Milksnakes bite their prey and wrap several coils around the animal squeezing tighter and tighter until the animal suffocates (Vogt 1981) or possibly suffers from a heart attack (P. Gregory, pers. comm.). This is advantageous because the snake can swallow the animal whole without being bitten (Vogt 1981). Very small prey such as baby mice and eggs are swallowed without the aid of constriction (Harding 1997). Young Milksnakes eat worms (R. MacCulloch, pers. comm.) and the young of other snake species including ringneck, garter, green, brown and redbelly snakes (Vogt 1981). In captivity, hatchling Milksnakes have been known to eat newborn mice readily (P. Gregory, pers. comm.). One rarely encounters a wild Milksnake in search of food because it is well-camouflaged and seeks refuge under cover during the day (Tyning 1990) and hunts at night (Harding 1997).

Adult Eastern Milksnakes eat rodents, reptiles, fish, and amphibians as well as a number of different invertebrates (A. Lentini, pers. comm.). Brown (1979) determined that mammals comprise 68% of all the food items and 79% of the food volume in those wild snakes he examined. He also stated that young mammals comprised 59% of all mammals taken. Birds make up 12.7% of food volume with a frequency of 19%, and reptiles comprised 8.1% of food volume with a frequency of 12.4% (as cited in Ernst and Barbour 1989). Surface (1906) found that, in the Pennsylvania specimens he studied, mice comprised 71.5% of the stomach contents (by volume), other mammals made up 11.0%, birds 5.5% and slugs 3.0% (as cited in Williams 1988). The Eastern Milksnake's preference for small mammals accounts for its occurrence in and around barns where mice and rats are common (Lamond 1994). The Eastern Milksnake has a high level of immunity against the venom of Southern Copperheads (*Agkistrodon contortrix*) and Timber Rattlesnakes (*Crotalus horridus*); these species make up part of the Eastern Milksnake's diet where they occur (Logier 1958).

It is possible that the Eastern Milksnake competes for food with other constrictors within its range (R. MacCulloch, pers. comm.); however, the importance of competition in snakes is not known (P. Gregory, pers. comm.). Possible competitors include the Eastern Foxsnake (*Elaphe gloydi*), the Black Ratsnake (*Elaphe obsoleta*), (R. MacCulloch, pers. comm.) and the Eastern Racer (*Coluber constrictor*) (Lazell 1976).

Food does not likely limit the northern distribution of the Eastern Milksnake as its most important food source (rodents) ranges farther north than snake itself (Bleakney 1958). When rodent populations are low, birds and their eggs could become a more significant food item (Bider and Matte 1996) (Table 2). In populated areas such as Toronto, apparent declines in Milksnake abundance probably are for reasons other than food availability because, unlike most predators of rodents, Milksnakes are able to enter small places and capture young mice in their nests. As a result, competition with other predators is limited (B. Johnson, pers. comm.).

Table 2. List of protected areas (including national parks, provincial parks, regional parks, conservation areas, reserves) where the Eastern Milk Snake has been sighted in Ontario (according to the OHS) and Quebec (according to the Databank of Amphibians and Reptiles of Quebec). District/Region/County in parenthesis.

Ontario
Cyprus Lake Provincial Park (Bruce)
Georgian Bay Island National Park (Bruce)
Inverhuron Provincial Park (Bruce)
MacGregor Point Provincial Park (Bruce)
Monocliffs Provincial Park (Dufferin)
Holiday Beach Provincial Park (Essex)
Point Pelee National Park (Essex)*
Dead Creek Conservation Area (Frontenac)
Craigleith Provincial Park (Grey)
Bronte Creek Provincial Park (Halton)
Long Point Provincial Park (Haldimand-Norfolk)
Selkirk Provincial Park (Haldimand-Norfolk)
Berry Conservation Area (Hamilton-Wentworth)
Rondeau Provincial Park (Kent)
Charleston Lake Provincial Park (Leeds & Grenville)
St. Lawrence National Park (Leeds & Grenville)
Browns Bay Provincial Park (Leeds & Grenville)
Ipperwash Provincial Park (Lambton)
Pinery Provincial Park (Lambton)
Murphy's Point Provincial Park (Lanark)
Killarney Provincial Park (Manitoulin)
Odonnell Point Park Reserve (Muskoka)
McDonald Bay Park Reserve (Muskoka)
Six Mile Lake Provincial Park (Muskoka)
Gibson River Nature Reserve (Muskoka)
Effingham Provincial Park (Niagara)
Rockway Conservation Area (Niagara)
Algonquin Provincial Park (Nipissing)
Mattawa Wild River Provincial Park (Nipissing)
Grundy Lake Provincial Park (Parry Sound)
Blackstone Harbour Provincial Park Reserve (Parry Sound)
Forks of the Credit Provincial Park (Peel)
Petroglyphs Provincial Park (Peterborough)
Sandbanks Provincial Park (Prince Edward)
Outlet Beach Provincial Park (Prince Edward)
Prince Edward Point Nature Wildlife Area (Prince Edward)
Methodist Point Park Reserve (Simcoe)
Matchedash Park Reserve (Simcoe)
Quebec
Parc Gatineau (Gatineau)
Parc Nature Cap St-Jacques

Growth and survivorship

As with most snakes, very little is known about the life of young milksnakes (Tyning 1990), such as whether or not young feed before the onset of their first winter. At the northern edge of the snake's range, there may be little or no feeding opportunity for newly hatched milksnakes because the hatchlings must find a site for hibernation before winter sets in (Tyning 1990). However, if the hatchlings emerge in July as has been documented in the Hamilton, Ontario (P. Gregory, pers. comm.; Lamond 1994), then they may feed for some weeks before going into hibernation.

According to Fitch and Fleet (1970), who studied Eastern Milksnakes in Northeastern Kansas, hatchlings grow an average of about 15% over their original length (or 30 mm) within the first 2 months of their active life. These first-year snakes are fairly recognizable from other snakes since they make up a distinct size class. They range in size from 198-268 mm (mean = 237 mm) snout-vent length (SVL). In this age class, the average length of the females was not significantly different than that of the males. Second-year snakes are thought to be between 296-397 (mean = 360) mm SVL. Although some overlap likely occurs between 2nd and 3rd year individuals, 400 mm SVL can be used as a boundary to separate these two age groups. Third-year snakes range from 400 to 500 mm SVL and rapid growth continues on into the 3rd, 4th and 5th years (Fitch and Fleet 1970).

As no population studies have been carried out on the Eastern Milksnake in Canada, population age structure and stability cannot be determined. In addition, no studies have been conducted to determine the most critical life stage with respect to survival. However, the evidence that the species may live over 20 years, combined with a potential for low rates of adult mortality because its subterraneous habits may afford protection from predators, suggests that Milksnakes in Canada may have a long-lived life history in which high adult survivorship is critical (R. Brooks, pers. comm.). Depending on when young hatch, they may not feed before their first winter and as a result would only grow minimally (with nourishment provided by the stored yolk) and would lose weight even before hibernation (Fitch and Fleet 1970). This makes hatchlings extremely vulnerable to starvation if optimum hibernation sites are not found (A. Lentini, pers. comm.). It has been suggested that larger hatchlings would have a selective advantage by being stronger and more able to get food (Dyrkacz 1977). It has also been suggested that female Milksnakes are more vulnerable than males because females are often found basking in the open and tend to hold their ground when threatened by humans or predators (B. Johnson, pers. comm.).

Hibernation

Milksnakes can be active as late as October and November (Lamond 1994); OHS records show that 46 snakes were observed in October and 4 in November. The optimal temperature for hibernation for most snakes is in the range of 4 – 6° C. Temperatures higher than this will cause snakes to be susceptible to bacterial infection (A. Lentini, pers. comm.); however, higher temperatures do not appear to be a problem

for captive milksnakes (P. Gregory, pers. comm.). These snakes also require a hibernation site with enough moisture to prevent desiccation over the course of the winter (A. Lentini, pers. comm.). Suitable hibernation sites include mammal burrows, old building foundations (Lamond 1994), crawl spaces (Harding 1997), old wells and cisterns, stone walls, gravel and dirt banks, hollow logs, rotting stumps (Ernst and Barbour 1989) or rock crevices (Tyning 1990). The same sites may be used more than once (Ernst and Barbour 1989). There are many reports of milksnakes in basements of older homes in highly populated areas (Johnson 1989) where hibernacula may be limited due to the destruction of habitat.

Large Eastern Milksnake hibernacula have not been reported (Bider and Matte 1996) although these snakes often hibernate communally (Harding 1997). In the OHS database, the largest reported group of Eastern Milksnakes was 17 individuals; however, the time of year was not reported. A group of eight Milksnakes was reported in April in a rock pile that was probably a hibernation site. Most often, snakes were sighted alone or with one other individual. Eastern Milksnakes have been seen near their hibernacula in May and September basking with a number of other Eastern Milksnakes (Vogt 1981) or with other species including copperheads, racers, rattlesnakes (Tyning 1990) and garter snakes (Johnson 1989). Communal basking near the hibernaculum is quite common (Coffin and Pfannmuller 1988). In the spring, milksnakes in northern areas and those that live in higher elevations may emerge from their den sites before other species of snakes (Tyning 1990). According to the OHS database, 17 Milksnakes were sighted in April and 208 were sighted in May.

Behaviour

The Eastern Milksnake is very secretive, therefore little is known about its behaviour in comparison to many other snakes (Ernst and Barbour 1989). There is no evidence that the Eastern Milksnake defends territories from conspecifics (Tyning 1990). Although the home range of individuals is expected to be several hectares, this information is still unknown (Tyning 1990). The Eastern Milksnake can be found in association with a number of other species of snakes such as the Eastern Gartersnake (*Thamnophis sirtalis sirtalis*), the Common Watersnake (*Nerodia sipedon sipedon*) (ONHIC 1997), the Chicago Gartersnake (*Thamnophis sirtalis semifasciatus*), and the Plains Gartersnake (*Thamnophis radix*) (Dyrkacz 1977), either under the same cover or nearby. This suggests that the Eastern Milksnake does not defend territories from these other species.

Some Eastern Milksnakes can be quite unpredictable whereas others can be handled fairly easily; thus they vary in temperament (Bider and Matte 1996). They are easy to capture in the field but attempt to move away when approached (Green and Pauley 1987). Comparison of population distribution maps of human settlement throughout southern Ontario and Quebec (Anon 1985) with distribution maps of the Eastern Milksnake in Canada, shows that the two distributions overlap almost completely. Therefore, the Eastern Milksnake needs a high degree of tolerance to human disturbances.

Although this species prefers to avoid confrontation (Harding 1997), there are certain behavioural characteristics of the Eastern Milksnake which do render it vulnerable to human persecution. For example, when disturbed or threatened it takes on a defensive pose, raises its head in the air (Bider and Matte 1996), vibrates its tail and attempts to bite (Green and Pauley 1987). When picked up, it often bites with a persistent "chewing" motion or hangs on so that it is difficult to remove (P. Gregory, pers. comm.). If the vibrating tail hits dry leaves or some other sort of object the sound produced resembles sounds made by rattlesnakes. This sort of behaviour is thought to protect the Milksnake from potential predators by mimicking the sound of rattlesnakes (Lamond 1994). If predators hesitate before attacking, this will afford the Milksnake time to escape to suitable cover (Tyning 1990). Unfortunately, many people feel threatened by this harmless "rattlesnake" and often kill it. There have been a number of reports in the Toronto area of "rattlesnakes" which turned out to be Milksnakes (Johnson 1989; D. Scallen, pers. comm. 2002).

Movement and migration

There is no information available on the movement and migration of the Eastern Milksnake in Canada; however, Fitch and Fleet (1970) studied the movement of several individuals in northeastern Kansas. Movements made by six individual milksnakes that were captured, marked and recaptured over a period of several months were between 76 and 396 m, with a mean distance moved of 254 m. Six of these movements were between 244-293 m. Thus, if a typical home range radius is represented by the mean movement of 254 m then a home range of an Eastern Milksnake can be estimated to cover 20 hectares, assuming a circular home range.

In the spring and fall, Milksnakes can be found farther upland than they are in midsummer. It is assumed that they are migrating to and from their hibernacula (Ernst and Barbour 1989). The snakes may migrate to lowland areas in summer because these areas are more moist and food is more plentiful (Breckenridge 1958 as cited in Williams 1988).

Many reptiles do use migration or dispersal routes that cross roads and areas of development. Along the Long Point Causeway, Lake Erie, Ontario, adjacent to Big Creek National Wildlife Area a survey of road mortality was conducted by Ashley and Robinson (1996). This study showed that wildlife road mortality followed a seasonal trend and was higher in the spring and autumn, presumably due to migration to and from hibernation sites. There are over 226 reports of Eastern Milksnakes that were dead on the road (D.O.R.) in the OHS database. Road mortality is highest in May and June and declines in July. This is followed by an increase in August and a steady decrease until November. Road mortality occurs during each month of the milksnake's active season, suggesting that routes to several breeding, feeding and hibernation sites cross roadways. Furthermore, according to the OHS database only 2 were seen basking on a road. Thus, it is less likely that the Eastern Milksnakes are using roadways as basking platforms (since they generally bask under cover) as much as other snakes and they are more likely using these roads as dispersal and migration routes.

POPULATION SIZES AND TRENDS

There are no estimates of the sizes of Eastern Milksnake populations in Ontario (M. Oldham, pers. comm.) or Quebec (D. Rochique, M. Lepage, pers. comm., 2002). The OHS database contains 1443 sightings with a few from the late 1800s, but most from the 1970s and mid-1990s. The number of sightings in the Quebec database is 134 from 1874, but most sightings were reported from 1950 to 1997. A growing curiosity for natural history, an increase in the number of observers, and more comprehensive field-work likely account for the increase in the number of individuals reported in Ontario and Quebec within the last several years.

The information in the databases from both the ONHIC and St. Lawrence Valley Natural History Society are not systematic inventories. Therefore, the absence or presence of recent records is not indicative of species increase or decline in areas where they had been historically sighted and have not been sighted recently (M. Oldham, pers. comm.). It is possible that either no significant search effort has been made in these areas (M. Oldham, pers. comm.) or that sightings have not been reported.

Although few studies have been carried out on the Eastern Milksnake in Canada, there are certain areas that have been critically analyzed with respect to the persistence and well-being of this species. For example, Johnson (1982) looked at the distribution of the Eastern Milksnake in Toronto, Ontario, and found that while this species was ranked as locally common, it was in decline. Remnant populations are found in abandoned farms, areas where farms used to occur, river valleys and the ravines at the back of homes. These habitats are all associated with a supply of mice, a major prey item for the Eastern Milksnake. However, these areas also are generally surrounded by development (Johnson 1982) and are thus isolated from other populations. In the recent past, this may have caused increased local extirpation due to demographic stochasticity. Many city ravine habitats are now being reconnected through habitat restoration programs, enhancing dispersal between populations (B. Johnson, pers. comm.). Nevertheless, except for the remnant population in the Rouge Valley, all other known Milksnake populations in the Toronto area are declining or have gone due to alteration of habitat. It has been suggested that Ontario Eastern Milksnake populations outside the Toronto area are not in decline (Johnson 1982). However, no studies have determined if this is correct, and there are no historical population estimates to compare how the current status of the Eastern Milksnake has changed from past to present (M. Oldham, pers. comm.). Similarly, no historical population estimates exist for the Quebec eastern Milksnake populations (D. Rodrigue, pers. comm.). Clearly, an inventory is urgently needed for this species to assess its abundance and distribution and to provide a basis for future assessment of demographic trends.

LIMITING FACTORS AND THREATS

There are a number of real and potential factors limiting or reducing the number of Eastern Milksnakes in Ontario and Quebec, as well as in areas in the United States. The current problems include: 1) habitat loss due to urbanization (including road building) and habitat modification, 2) intensive land use practices, such as forestry and agriculture, 3) persecution by people, 4) predation by feral and domestic cats and dogs, 5) mortality on roads.

1. Habitat loss due to urban encroachment and habitat modification

Undoubtedly, Eastern Milksnake habitat loss has occurred throughout southern Ontario and Quebec (M. Oldham, pers. comm.). For example, such loss has occurred in Rattray Marsh Conservation area in a number of different ways. The development of housing complexes in the nearby area has decreased field size as well as forest and marsh cover. With the disappearance of this adjacent habitat, the likelihood of immigration from other areas is decreased and thus many remnant populations may become extirpated after an extended period of isolation (Hussey and Goulin 1990). The increased use of Rattray Marsh area by humans has resulted in a loss of vegetation cover due to increased ground trampling. Consequently, with fewer places to hide, Milksnakes are more vulnerable to human interference. Also, the old buildings and barns of early settlements that are used by Milksnakes to find mice and hibernation sites are being removed (Hussey and Goulin 1990). In Toronto, all populations of the Eastern Milksnake are found near old farm buildings or areas where farm buildings used to stand (Johnson 1989). In the future, it is probable that such buildings will be removed to allow for further urban development. Hull and the west island of Montreal are the locations of the two largest concentrations of Eastern Milksnake sightings in Quebec (Bider and Matte 1996). Both areas are open to development, thus imposing further threat on the survival of Milksnakes located near these urban centres (Bider and Matte 1996).

2. Land use practices

It is thought that the reversion of abandoned fields back to forests in certain areas of the United Stated has caused a decline in Milksnake populations (Hunter et al. 1992; DeGraaf and Rudis 1983) because active agricultural areas support abundant rodent populations in rubbish heaps and buildings (Vogt 1981). However, according to the Hamilton Herptofaunal Atlas, there are more snakes found in areas with a greater percentage of forest cover and fewer snakes found in areas that are less forested (Lamond 1994). Farming machinery has proven to be a problem. Several Milksnakes in the OHS records were found wrapped in hay bales or taken up in hay balers. These issues need to be explored to determine the effects of forestry and agriculture. Modern barns and farming practices may reduce rodent populations and make these operations less habitable for Milksnakes (F.R. Cook, pers. comm. 2002).

3. Persecution by people

Although this problem is decreasing, Milksnakes are still killed by people because the snakes are large, aggressive, frequent basements and act like a venomous species when frightened.

4. Predation

Despite the secretive behaviour of the Eastern Milksnake, it still has a fair number of predators (Harding 1997), especially of hatchlings and small juveniles. Predators of Eastern Milksnakes include bullfrogs (*Rana catesbeiana*), brown thrashers (*Toxostoma rufum)* (Mitchell 1994), hawks, owls, raccoons, coyotes, foxes, skunks, opossums (Ernst and Barbour 1989), other snake species (Hunter et al. 1992) and the Eastern Milksnake itself (Ernst and Barbour 1989). Weasels and shrews, which hunt underground for food, may pose a threat to eggs and young hibernating milksnakes (Harding 1997).

Pets, such as dogs and cats, that are associated with the increase in human populations also kill Milksnakes (Hussey and Goulin 1990). In the OHS database there are two records of Eastern Milksnakes killed by dogs. However, cats are likely the major predator of Milksnakes, especially young snakes. Large numbers of feral, barnyard and domestic cats would almost certainly have an impact on Milksnake populations around farms and residential areas (e.g. see Carbone and Gittleman 2002). Although the Eastern Milksnake is not in high demand in the pet trade, it is possible that hunting and poaching of snakes for pets may increase in areas which have an encroaching human population (Hussey and Goulin 1990).

Lazell (1976) proposed three reasons why the Eastern Milksnake was so plentiful in the Cape Cod area. First, he recognized an abundant supply of small mammals such as Meadow Voles (*Microtus pennsylvanicus*), White-footed Mice (*Peromyscus leucopus*), Masked Shrews (*Sorex cinereus*), Short-tailed Shrews (*Blarina brevicauda*), and Common Moles (*Scalopus aquaticus*). Second, he noted the absence of the Eastern Racer (*Coluber constrictor*) a principal competitor and an infrequent predator of the Eastern Milksnake. Last, he determined that predators such as raccoons, foxes, skunks and weasels were not present in this region (Lazell 1976). Any factor that changes one of the above favourable situations will adversely affect Eastern Milksnake populations.

5. Mortality on roads

In the Hamilton area, 27% of all the Eastern Milksnakes sighted were dead on roadways (Lamond 1994), and 16% of all Ontario sightings are incidences of Milksnake road mortality (ONHIC 1997). This road mortality is likely causing declines or extirpations in this species, but there are no data to test these possibilities.

SPECIAL SIGNIFICANCE OF THE SPECIES

Froom (1972) stated that "the Milksnake is one of our most beneficial and beautiful snakes'. Although the economic impact of the Milksnake has never been quantified, it is thought to be extremely beneficial, particularly for farmers (Froom 1972; Hunter et al. 1992; Logier 1958; McCauley 1945). Milksnakes will hunt around old buildings in search of mice, thus decreasing mouse populations in older homes and around farm buildings (Ditmars 1939). The Milksnake also most often takes young mice from their nests within old foundations and walls (Lazell 1976), thus killing them before they have the opportunity to destroy farmers' crops (Froom 1972). Unfortunately, the Milksnake is often persecuted and killed (Froom 1972).

The Eastern Milksnake is not as attractive as members of the other more colourful subspecies of Milksnakes (Bartlett 1987) and therefore, is not as much in demand in the pet trade (Ernst and Barbour 1989). Nevertheless, there is concern with respect to the Eastern Milksnakes' vulnerability to massive collecting because it is viewed as a desirable pet in some areas. A mid-sized Eastern Milksnake can bring in anywhere from $25 to $35US. As with many other large snakes, over-collecting and destruction of hibernacula may cause Milksnakes to become locally extirpated (Coffin and Pfannmuller 1988).

There is adverse public opinion and prejudice against the Eastern Milksnake. This species derives its name from the misconception that it can milk cows. There are several reasons why such a ridiculous belief could never be true. First and foremost, the Milksnake's mouth and six rows of razor sharp teeth are not built for sucking, and cows would sternly object to being suckled by six rows of needle-like teeth. Second, the stomach volume of a fully grown Milksnake may be as large as 49 cm^3 but in a pint of milk there are almost 475 cm3 (Logier 1958); therefore, even if the Milksnake could suckle it would not be able to take a substantial amount of milk. Lastly, Milksnakes show no interest in milk (Ditmar 1907). Captive individuals cannot be made to drink milk unless severely thirsty (Conant and Collins 1991). Farmers actually once believed that they suffered financial losses from Milksnakes due to a decrease in milk production by cows (Cook 1984). Such a fallacy about the Eastern Milksnake along with misconceptions about snakes in general have caused the species to be persecuted (Ditmars 1907).

The Eastern Milksnake is often confused with a number of other snakes. These include the Black Ratsnake (*Elaphe obsoleta*), Watersnakes (*Nerodia* spp.), Eastern and Western Foxsnakes (*Elaphe* spp.), as well as juvenile racers (Harding 1997). Misidentification can lead to inaccurate records of the Eastern Milksnake's distribution and abundance, causing a false impression of the number of Milksnakes that exist in certain areas.

EXISTING PROTECTION OR OTHER STATUS

In Ontario, the Eastern Milksnake has been listed as a "specially protected species" under Schedule 9 of the Fish and Wildlife Conservation Act, 1997. Part II, section 5 of this Act prohibits the hunting or trapping of any specially protected reptiles. Part III, Section 40, states that a specially protected reptile cannot be kept in captivity. However, this does not apply when a specially protected reptile is kept in captivity for personal education or scientific purposes, or for any other purpose as long as a Minister has given authorization to do so. Propagation or possession of a specially protected reptile for propagation is prohibited under Section 45. The buying and selling of a specially protected reptile is prohibited by Part IV section 48. Section 53 and section 55, prohibit the transport of a specially protected reptile into or out of Ontario. All of the above sections are followed by the stipulation "except under the authority of a licence and in accordance with the regulations".

In Quebec, the Eastern Milksnake is afforded protection under "Loi sur la conservation et la mise en valeur de la faune", Quebec's Act respecting the conservation and development of wildlife (R.S.Q.c. C-61.1). Article 26 of this act states that "No person may disturb, destroy or damage ... the eggs, nest or den of an animal", and thus, the destruction of eggs as well as any hibernating sites of snakes is prohibited. Article 42 protects the Eastern Milksnake from captivity or trade. This article states that "to keep an animal in captivity or to capture it with a view to keeping it in captivity and, where such is the case, to dispose thereof, a person must hold a licence issued for such purpose and comply with the norms, numbers and conditions prescribed by regulation". The Eastern Milksnake is not listed in this Act as a species that can be kept in captivity (R.S.Q.c. C-61.1 r 0.0001); therefore it is illegal to do so (P. Aquin, pers. comm).

The regulations of Quebec are general and do not specifically focus on the Eastern Milksnake. Although the regulations of Ontario are specific with regard to the Milksnake as a species of special consideration, neither the Ontario nor Quebec regulations can protect the Milksnake from what appear to be its two greatest potential causes of decline: road mortality (Harding 1997) and deliberate killing by humans (B. Johnson, pers. comm). The illegal pet trade is the most easily enforced regulation; however, it is unlikely that the pet trade is a threat to wild Eastern Milksnake populations in Canada since they are easily bred in captivity. As a result, those people who are seeking a Milksnake as a pet can obtain one from captive-bred stock and do not have to exploit wild populations (P. Gregory, pers. comm.).

SUMMARY OF STATUS REPORT

In Quebec, the status rank of the Eastern Milksnake is currently S3, meaning that it is now considered "widespread, abundant and apparently secure, but with cause for long term concern" (P. Aquin, pers. comm.). Although the number of Eastern Milksnakes recorded each year in Quebec is small, it is possible that this species is

more abundant than currently suggested by the databank. The reason for this is that the Eastern Milksnake is more difficult to find than many other species of snakes, and several areas that contain ideal habitat for the Milksnake have yet to be surveyed (D. Rodrigue, pers. comm.). Nevertheless, in intensive annual surveys of herpetofauna of the Mt. St. Hilaire region, the Milksnake is one of the least often encountered species (D.M. Green, L. Bol, pers. comm.). In Ontario, the OHS database suggests that the Milksnake is widespread in southern Ontario. It has been suggested, without much evidence, that populations outside Toronto are not in decline. In Toronto, it is hoped that the current restoration of habitat will reverse previous declines of Milksnakes (B. Johnson, pers. comm.).

Globally, the Eastern Milksnake is ranked G5 (very common) (P. Aquin, pers. comm.). However, in Minnesota, the Eastern Milksnake is given special concern status by the Department of Natural Resources due to its high demand in the pet trade (Oldfield and Moriarty 1994). In Pennsylvania, habitat loss due to urbanization and deforestation has resulted in the lowland intergrade of the Eastern Milksnake becoming threatened with local extirpation (Mitchell 1994).

Although it appears that there may still be many Eastern Milksnakes in Ontario and Quebec, very little is known about its life history or population status in Canada. Similarly, there are no data that allow one to compare current versus historical Eastern Milksnake habitat to determine whether or not it has changed. No population studies have been carried out and a large number of areas have not been surveyed. Even some of the current OHS records are suspect. There appear to be no Milksnakes on Pelee Island (B. Porchuk, pers. comm. 2002), Pt. Pelee National Park or Rondeau Provincial Park (S. Gillingwater, pers. comm., 2001), yet these areas all have recent OHS records. Likely these were juvenile Eastern Foxsnakes (*Elaphe gloydi*) misidentified as Milksnakes (S. Gillngwater, R. Willson, pers. comm. 2002).

An informal survey of several prominent naturalists and herpetologists found in 2002 that most felt that the Eastern Milksnake was locally common at best, and that it had declined. Some suggested that the species' apparent rarity was an artifact of its nocturnal and "subterranean" habits. Certainly, it is possible that the dearth of recent sightings by these observers has occurred because of the species' cryptic behaviour, and that the decline in sightings is largely imaginary. Nevertheless, all other large snakes in Eastern Canada have declined and it is reasonable to suspect that Milksnakes have too, especially because they are as susceptible to roadkill, persecution and habitat loss as are other snakes. Therefore, given the species apparent rarity, the existence of known threats and the lack of any data to support the claim that Milksnakes are secure, the recommendation is for Special Concern until surveys are conducted that provide evidence that the species is abundant or otherwise.

TECHNICAL SUMMARY

Lampropeltis triangulum triangulum
Eastern Milk Snake — *Couleuvre tachetée*
Ontario, Quebec

Extent and Area information	
• extent of occurrence (EO)(km²)	~ 250,000km²
• specify trend (decline, stable, increasing, unknown)	Unknown
• are there extreme fluctuations in EO (> 1 order of magnitude)?	No
• area of occupancy (AO) (km²)	~ 65,000km²
• specify trend (decline, stable, increasing, unknown)	Decline
• are there extreme fluctuations in AO (> 1 order magnitude)?	No
• number of extant locations	Unknown
• specify trend in # locations (decline, stable, increasing, unknown)	Decline
• are there extreme fluctuations in # locations (>1 order of magnitude)?	No
• habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat	Declining area and quality
Population information	
• generation time (average age of parents in the population) (indicate years, months, days, etc.)	~ 7 years
• number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)	Unknown
• total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals	Unknown
• if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)	--
• are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?	--
• is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?	No
• list each population and the number of mature individuals in each	Quebec: 3000-5000 Ontario: Unknown
• specify trend in number of populations (decline, stable, increasing, unknown)	Unknown
• are there extreme fluctuations in number of populations (>1 order of magnitude)?	No
Threats (actual or imminent threats to populations or habitats)	
- habitat loss (development, agriculture, deforestation) - human persecution, possibly pet trade - roadkill, habitat fragmentation by roads - loss of hatchlings and juveniles to feral and domestic cats, dogs	

Rescue Effect (immigration from an outside source)	
• does species exist elsewhere (in Canada or outside)?	Yes
• status of the outside population(s)?	Not at risk
• is immigration known or possible?	Possible
• would immigrants be adapted to survive here?	Yes
• is there sufficient habitat for immigrants here?	Unknown
Quantitative Analysis	

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